

REMARKS

Claims 2-14 and 16-19 are pending in the application. Claim 16 has been amended. Claims 41 and 42 have been added. No new matter has been introduced.

35 U.S.C. §112, 1<sup>st</sup> paragraph

Claim 16 has been amended. The Applicant believes that these amendments address the rejection under 35 U.S.C. § 112, 1<sup>st</sup> paragraph and should now be in condition for allowance under same.

Rejection under 35 U.S.C. § 102(e)

Claims 16, 6, 12, and 17 were rejected under 35 U.S.C. § 102(e) as being anticipated by Tayebati et al. (U.S. Pat. No. 6,025,950). Before discussing the specifics of the rejection, the Applicant believes that a brief discussion of the Applicants' claimed invention and Tayebati et al. may be useful.

The Applicants teach and claim, as recited in claim 1, a spatial light modulator having an array of pixels formed on a semiconductor substrate (Fig. 1). Each pixel includes a solid state electro-optic material positioned between a first electrode and a second electrode. A first layer of dielectric material forms a first mirror underneath the electro-optic material and a second layer of dielectric material forms a second mirror above the electro-optic material. The mirrors form a cavity with the electro-optic material being within the cavity. An array of pixel circuits (Fig. 4) are formed with the semiconductor substrate. Each pixel is connected to a pixel circuit. New claim 41 recites each pixel connected to a respective pixel circuit.

As discussed in the specification on page 3, lines 18-20 as originally filed and recited in new claim 42, the cavity just described may form a Fabry-Perot etalon structure and be used as a Fabry-Perot filter to enhance the modulation effects provided by the spatial light modulator.

In contrast, Tayebati et al. teach a spatial light modulator that does not have a mirror above the electro-optic material and below the electro-optic material. In reference to Fig. 7, in col. 6, lines 29-49, Tayebati et al. describe the structure of an embodiment of their spatial light

modulator. This structure includes a transparent electrode 205 on a buffer layer 210. Between the buffer layer and a mirror electrode 220 resides an electro-optic region 215.

The mirror electrode 220 comprises a semiconductor material such as alternating layers of gallium aluminum arsenide and gallium arsenide, or alternating layers of aluminum arsenide and arsenide.

The buffer layer 210, however, comprises a low photoconductive semiconductor material such as low temperature growth gallium aluminum arsenide. Alternatively, the buffer layer 210 could comprise a dielectric material such as phosphate silica glass.

Tayebati et al. do not teach alternating layers of gallium aluminum arsenide and gallium arsenide, or other such materials, used to form the buffer layer 210 in reference to Fig. 7 or elsewhere in the patent, such as in col. 5, lines 29-36. Thus, because there are no alternating layers of materials used in the buffer layer 210, the buffer layer 210 alone does not act as a mirror above the electro-optic region 215.

The inherent relative indices of refraction of the transparent electrode 205 and dielectric layer 210 could form a mirror, but the intersection of different indices of refraction would only work as a mirror beyond a given angle of incidence, which is not discussed by Tayebati et al. This is further evidenced by the drawings (e.g., Figs. 6 or 7) showing optical angles that indicate incident and reflection beams being at 0 degrees (i.e., perpendicular) to the mirror electrode 220. Thus, the two layers 205 and 210 would not act as a mirror at this angle.

In addition, Tayebati et al. teach trades for optical efficiency and resolution. See col. 3, lines 39-42 ("absorb relatively little of the light which is to be modulated") and col. 3, lines 35 ("good device resolution"). Adding a mirror above the electro-optic region 215, such as in the buffer layer 210, would reduce the efficiency of the spatial light modulator and possibly diminish the resolution.

Accordingly, because Tayebati et al. do not teach every claim limitation ("forming a first mirror underneath the electro-optic material and . . . a second mirror above the electro-optic material") of Claim 16, the Applicant respectfully submits that the rejection under 35 U.S.C. § 102(e) is improper and should be withdrawn.

Because Claims 6, 12, and 17 depend from Claim 16, these claims should be allowed under 35 U.S.C. §102(e) for at least the same reasons.

Rejections under 35 U.S.C. § 103(a)

Claims 2-4, 5, 7-11, 13-14, and 18-19 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Tayebati et al. in view of Robinson et al. (U.S. Pat. No. 6,091,463), Bowman et al. (U.S. Pat. No. 5,637,883), or Gobeli (U.S. Pat. No. 5,768,003). For reasons discussed above, and as stated in part 14, page 9, lines 2-5 of the Office Action dated October 22, 2001 with respect to Robinson et al., Bowman et al., and Gobeli (these cited references do not teach "a first mirror underneath the electro-optic material and a second mirror above the electro-optic material"). Thus, these references, either alone or in combination with Tayebati et al. do not teach all the limitations of claim 16 ("forming a first mirror underneath the electro-optic material and . . . a second mirror above the electro-optic material").

Accordingly, the Applicant respectfully submits that the rejections under 35 U.S.C. § 103(a) should be withdrawn.

CONCLUSION

In view of the above amendments and remarks, it is believed that all now pending claims (Claims 2-14, 16-19, and 41-42) are in condition for allowance, and it is respectfully requested that the application be passed to issue. If the Examiner feels that a telephone conference would expedite prosecution of this case, the Examiner is invited to call the undersigned at (978) 341-0036.

Respectfully submitted,

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Dated: 2/24/03

MARKED UP VERSION OF AMENDMENTSClaim Amendments Under 37 C.F.R. § 1.121(c)(1)(ii)

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16. (Three times amended) A spatial light modulator comprising:

an array of pixels formed on a semiconductor substrate, each pixel including a solid state electro-optic material positioned between a first electrode and a second electrode;

a first layer of dielectric material forming a first mirror underneath the electro-optic material and a second layer of dielectric material forming a second mirror above the electro-optic material, the first mirror and second mirror forming a cavity; and

[a first mirror underneath the electro-optic material and a second mirror above the electro-optic material forming a cavity; and]

an array of pixel circuits formed with the semiconductor substrate, each pixel being connected to a pixel circuit.